

Listing of Claims

1.(currently amended) A deposition baffle for protecting a dielectric window in a plasma processing chamber while facilitating inductive coupling of RF energy from a coil outside of the window, through the window and baffle, and into a plasma within the chamber, comprising:

an electrically conductive body having a window side and a plasma side;
the body having plurality of slots extending therethrough between the sides thereof;

the slots having walls defined by surfaces of the body and are configured to block line-of-sight paths through the body for particles in the chamber moving from the plasma side of the body to the window side of the body;

a plurality of the slots each having an electrically conductive structural element therein fixed to the body between opposite surfaces thereof on substantially only one of said sides of the body; and

the elements having connections to the body distributed on the baffle so as to improve the uniformity of the distribution of power coupled into the plasma through the baffle without limiting the effectiveness of inductive coupling through the baffle.

2. (original) The baffle of claim 1 wherein:

the slots have chevron-shaped cross sections.

3. (original) The baffle of claim 1 wherein:

the elements are electrically conductive bridges electrically interconnecting opposite walls of the slots on the plasma side of the body, thereby interrupting the slots on the plasma side of the body.

4.(withdrawn) The baffle of claim 1 wherein:

the elements are electrically conductive elongated blades spaced from the walls of the slots on the window side of the body, the elements being oriented parallel to

the slots and connected to the body at one of the walls of the slots without electrically connecting opposing walls across the slots.

5.(withdrawn) The baffle of claim 4 wherein:

the elements are electrically conductive elongated blades spaced from the walls of the slots, are oriented parallel to the slots and are connected to the body at one of the walls of the slots on the plasma side of the body.

6.(withdrawn) The baffle of claim 1 wherein:

the elements are electrically conductive elongated blades spaced from the walls of the slots, are oriented parallel to the slots and are connected to the body at one of the walls of the slots on the plasma side of the body.

7. (currently amended) An inductively-coupled-plasma source for inductively coupling RF energy into a plasma processing space within a plasma processing chamber, comprising:

- a dielectric window in a wall of the plasma processing chamber;
- a coil outside of the window and connected to an RF power source;
- a deposition baffle inside the plasma processing chamber and closely spaced from the dielectric window, between the plasma processing space and the window, the baffle having a body having a plurality of slots extending therethrough;
 - the slots being configured such that surfaces of the body bounding the slots block line-of-sight paths through the body for particles moving from the plasma processing space toward the window; and
- a plurality of the slots each having an electrically conductive structural element therein fixed to the body between opposite surfaces thereof on substantially only one of said sides of the body.

8. (original) The source of claim 7 wherein:

the connections of the elements to the body are distributed on the baffle so as to improve the uniformity of the distribution of power coupled into the plasma through the baffle without limiting the effectiveness of inductive coupling through the baffle.

9. (original) The source of claim 7 wherein:

the slots have chevron-shaped cross sections.

10. (original) The source of claim 7 wherein:

the elements are bridges interrupting the slots on the side of the body toward the plasma processing space.

11.(withdrawn) The source of claim 7 wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots on the side of the baffle toward the window.

12.(withdrawn) The source of claim **7** wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots and connected to one of the surfaces of the slots without electrically connecting opposing surfaces across the slot.

13.(withdrawn) The source of claim **7** wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots and connected to one of the surfaces of the slots on the side of the baffle toward the plasma processing space.

14. (original) The source of claim **7** wherein:

the baffle and the coil form an RF circuit having a resonant frequency approximately at the frequency of the RF source.

15. (original) A plasma processing apparatus comprising a vacuum chamber, a substrate support within the chamber, and the inductively-coupled-plasma source of claim **7**.

16. (original) The apparatus of claim **15** further comprising:

a controller programmed to control the apparatus to ignite a plasma within the plasma processing space according to a plasma ignition method that includes the steps of:

energizing the coil with RF power of at least 300 watts, but less than 600 watts;

then, ramping DC power to an electrode coupled to the plasma processing space from 0 watts to up to a level of not more than approximately 20 watts over a period of several seconds and thereby igniting a plasma within the processing space;
upon ignition of the plasma, revising the RF power and the DC power to substrate processing parameters;
maintaining substrate processing parameters while processing a substrate; and
processing a substrate in the plasma processing space.

17. (currently amended) The apparatus of claim ~~[[15]]~~ **16** wherein:

the chamber has a sputtering target therein that forms said electrode; and,
the revising of the DC power includes setting the DC power to the target at a sputtering power level.

18.(currently amended) The apparatus of claim ~~[[15]]~~ **16** wherein:

the ramping of the DC power includes ramping the power to a level that varies inversely with pressure in the chamber according to a relationship that produces approximately 5 watts when the pressure is approximately 65 mTorr and approximately 10 watts when the pressure is approximately 20 mTorr.

19.(withdrawn) A method of igniting a plasma in an ICP processing apparatus having a plasma processing chamber, an RF coil outside of the chamber for coupling RF energy into a plasma processing space within a plasma processing chamber, and a DC electrode coupled to the plasma processing space, the method comprising:

energizing the coil with RF power of at least 300 watts, but less than 600 watts;

then, ramping DC power to the electrode from 0 watts to up to a level of not more than approximately 20 watts over a period of several seconds and thereby igniting a plasma within the processing space;

upon ignition of the plasma, revising the RF power and the DC power to substrate processing parameters;

maintaining substrate processing parameters while processing a substrate; and

processing a substrate in the plasma processing space.

20.(withdrawn) The method of claim **19** wherein:

the ramping of the DC power includes ramping the power to a level that varies inversely with pressure in the chamber according to a relationship that produces approximately 5 watts when the pressure is approximately 65 mTorr and approximately 10 watts when the pressure is approximately 20 mTorr.

21. (currently amended) A deposition baffle for protecting a dielectric window in a plasma processing chamber while facilitating inductive coupling of RF energy from a coil outside of the window, through the window and baffle, and into a plasma within the chamber, comprising:

an electrically conductive body having a window side and a plasma side;
the body having plurality of slots extending therethrough between the sides thereof;

the slots having walls defined by surfaces of the body and configured to block line-of-sight paths through the body for particles in the chamber moving from the plasma side of the body to the window side of the body;

a plurality of the slots each having an electrically conductive structural element therein fixed to the body between opposite surfaces thereof on substantially only one of said sides of the body; and

the elements having connections to the body distributed on the baffle so as to improve the uniformity of the distribution of power coupled into the plasma through the baffle without substantially limiting the effectiveness of inductive coupling through the baffle.

22. (original) The baffle of claim **21** wherein:

the slots have chevron-shaped cross sections when viewed in a direction parallel to the length of the slots.

23. (original) The baffle of claim **21** wherein:

the elements are electrically conductive bridges electrically interconnecting opposite walls of the slots on the plasma side of the body, thereby interrupting the slots on the plasma side of the body.

24.(withdrawn) The baffle of claim **21** wherein:

the elements are electrically conductive elongated blades spaced from the walls of the slots on the window side of the body, the elements being oriented parallel to

the slots and connected to the body at one of the walls of the slots without electrically connecting opposing walls across the slots.

25. (original) An inductively-coupled-plasma source for inductively coupling RF energy into a plasma processing space within a plasma processing chamber, comprising:

a dielectric window in a wall of the plasma processing chamber;
a coil outside of the window and connected to an RF power source; and
the deposition baffle of claim **21**.

26. (original) The source of claim **25** wherein:

the connections of the elements to the body are distributed on the baffle so as to improve the uniformity of the distribution of power coupled into the plasma through the baffle without limiting the effectiveness of inductive coupling through the baffle.

27. (original) The source of claim **25** wherein:

the slots have chevron-shaped cross sections when viewed in a direction parallel to the length of the slots.

28. (original) The source of claim **25** wherein:

the elements are bridges interrupting the slots on the side of the body toward the plasma processing space.

29.(withdrawn) The source of claim **25** wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots on the side of the baffle toward the window.

30.(withdrawn) The source of claim **25** wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots and connected to one of the surfaces of the slots without electrically connecting opposing surfaces across the slot.

31.(withdrawn) The source of claim **25** wherein:

the elements are elongated blades suspended in the slots and spaced from and parallel to the surfaces of the body bounding the slots and connected to one of the surfaces of the slots on the side of the baffle toward the plasma processing space.

32. (original) The source of claim **25** wherein:

the baffle and the coil form an RF circuit having a resonant frequency approximately at the frequency of the RF source.

33. (original) A plasma processing apparatus comprising:

a vacuum chamber, a substrate support within the chamber, and the inductively-coupled-plasma source of claim **25**.

34. (original) The apparatus of claim **33** further comprising:

a controller programmed to control the apparatus to ignite a plasma within the plasma processing space according to a plasma ignition method that includes the steps of:

energizing the coil with RF power of at least 300 watts, but less than 600 watts;

then, ramping DC power to an electrode coupled to the plasma processing space from 0 watts to up to a level of not more than approximately 20 watts over a period of several seconds and thereby igniting a plasma within the processing space;

upon ignition of the plasma, revising the RF power and the DC power to substrate processing parameters;

maintaining substrate processing parameters while processing a substrate; and

processing a substrate in the plasma processing space.

35. (original) The apparatus of claim **34** wherein:

the chamber has a sputtering target therein that forms said electrode; and, the revising of the DC power includes setting the DC power to the target at a sputtering power level.

36. (original) The apparatus of claim **34** wherein:

the ramping of the DC power includes ramping the power to a level that varies inversely with pressure in the chamber according to a relationship that produces approximately 5 watts when the pressure is approximately 65 mTorr and approximately 10 watts when the pressure is approximately 20 mTorr.

Application No. 10/080,496
Amendment dated May 10, 2004
Reply to Office Action of April 8, 2004

Amendments to the Drawings

The attached sheet of drawings includes changes to Fig. 1. This sheet replaces original sheet Fig. 1. In Fig. 1, previously omitted "10" has been added.

attachment: Replacement Sheet
Annotated Sheet Showing Changes